

THE STATUS OF INDIAN CROCODILIANS

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(With two plates)

INTRODUCTION

Crocodylians have been singularly unsuccessful in the 20th century. Most of the generally recognized 22 species survive exclusively in national parks, protected preserves and in farms and breeding stations. This non-success is due mainly to (a) the hunting for skins on a very wide scale with, till recently, very little or no restrictions on numbers and seasons and (b) habitat loss. The world market for crocodylian skins used to peak over 2,000,000 skins per annum. As late as 1976 the Colombian Government issued licenses for hunting 290,000 caiman (IUCN 1971).

The three species of Indian crocodylians are the mugger or marsh crocodile (*Crocodylus palustris*), the saltwater or estuarine crocodile (*Crocodylus porosus*), and the gharial (*Gavialis gangeticus*). Of these the mugger has been the most successful ecologically, adapting to a wide habitat range from hill streams and rivers to ponds, marshes and lakes. Gharials are restricted to deep, fast flowing northern rivers and estuarine crocodiles to coastal creeks and mangrove swamps.

METHODS OF STUDY

From 1973 on the Madras Snake Park Trust and the Bombay Natural History Society have

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sent questionnaires throughout the country enquiring about the status of crocodylians. Field workers of the Madras Snake Park have made survey trips or visits to all the states with known crocodile populations. Considerable correspondence and searching in old literature helped ascertain past status and distribution of India's crocodylians.

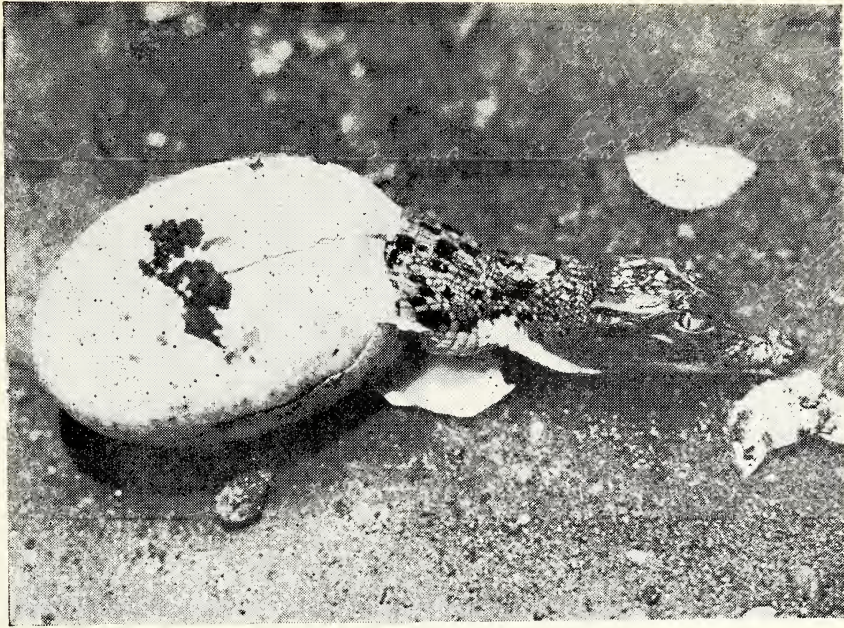
RESULTS AND DISCUSSION

Mugger were once extremely common in the former wide range from Dasht in the extreme west of Pakistan to Assam in north-eastern India and over most of the peninsula and Sri Lanka (Smith 1931).

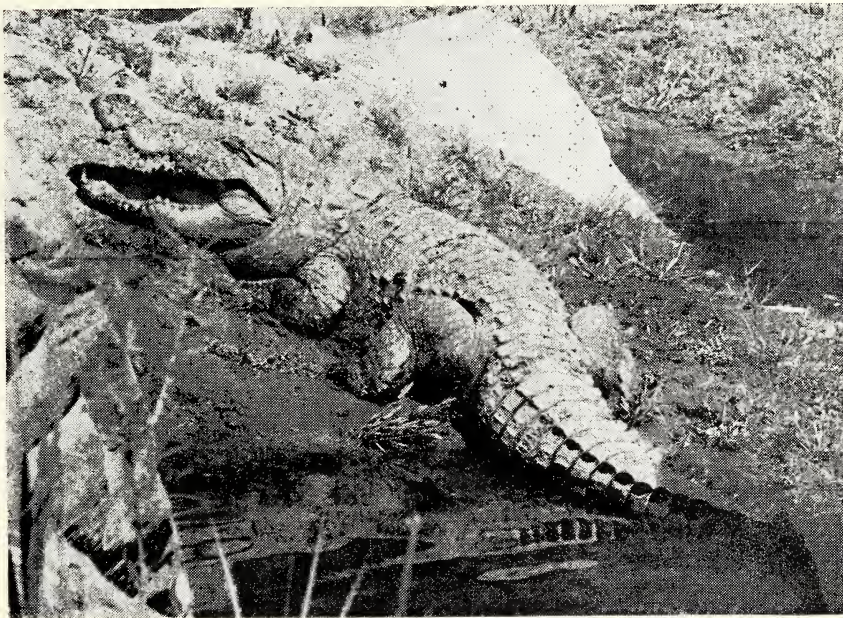
Estuarine crocodiles were plentiful in the Sunderbans in West Bengal, Bhitarkanika in Orissa (Daniel & Hussain 1974) and the Andamans and Nicobar Islands, since these areas support extensive mangrove swamps and tidal creeks. Other populations also existed along the southern east and west coasts but were already rare in the 1940's. Kerala, which today has no mangrove left, evidently once had a substantial population of estuarine crocodiles.

Old accounts, such as those of Andrew Leith Adams (1867), indicate how plentiful gharial used to be in northern rivers: 'The gharial or Indian alligator (*Gavialis gangeticus*) abounds in all the great rivers of Northern India... Ten or twenty may be frequently seen together...' Their range extended through-

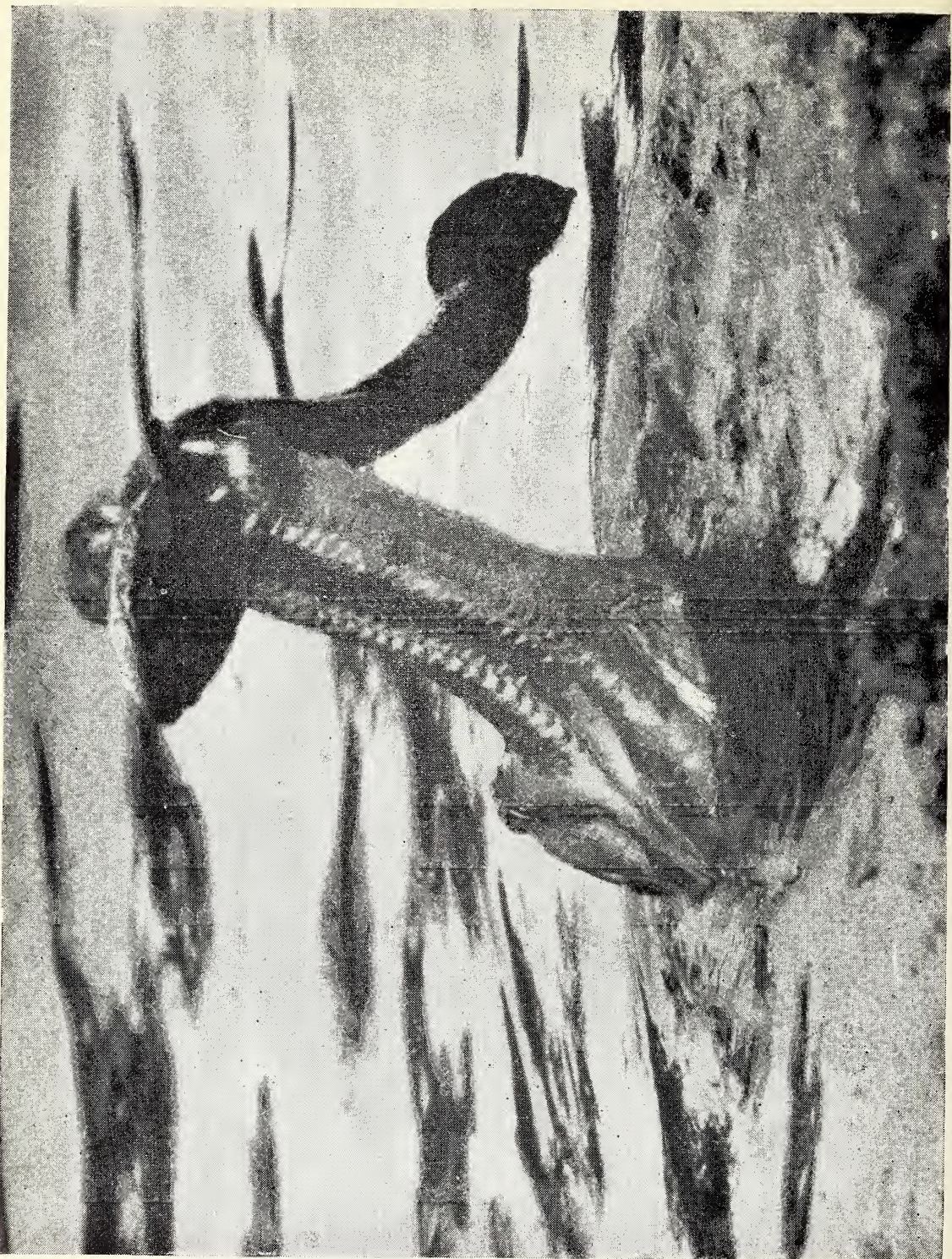
Whitaker & Daniel : Indian Crocodile



Estuarine Crocodile (*Crocodylus porosus*) hatching (Andamans).



Marsh Crocodile (*Crocodylus palustris*) in natural habitat (Corbett National Park).



out the Gangetic system, west to Pakistan and north-east to the Brahmaputra, with an isolated population in Orissa in the Mahanadi. Another early naturalist, Hornaday, in 1880 reported seeing 24 gharial in two hours on the Yamuna River, not far from Allahabad (Hornaday 1881).

Depletion :

The general reasons for the decline of the three species are uncontrolled and all-season hunting for hides, meat, 'medicine' and sport ; killing by fishermen ; extensive collection of eggs for eating, and loss of habitat caused by dam construction, river diversions, agricultural and forestry activities, water pollution and human disturbance and encroachment. It was recently observed that the gharial on the Karnali River (a group of seven adults) in Western Nepal failed to breed in 1976 because of the disturbance caused by a dam feasibility project (Whitaker 1976). Natural predation in crocodiles, especially in the egg and hatchling stage, is very high and gains importance in dangerously low populations, as is the case with India's three species. It is estimated that only 1-2% of hatchling crocodiles reach adulthood in nature.

The Skin Industry :

From interviewing skin dealers it is evident that a few people once made considerable profits on crocodile skins. Fishermen supplied the skin markets of Agra and Kanpur, whereas in other areas tribal crocodile hunters (operating throughout the north) supplied middlemen. In some parts of the country one or two 'specialist' hunters were apparently responsible for wiping out considerable populations. One well-known ex-hunter in Diglipur, North Andaman, claims to have killed a thousand crocodiles during his 15 year career.

With the 1972 ban on crocodile killing, the skin market went underground. The value of

crocodile meat, fat, gall bladder (for 'medicinal' uses) and other parts still makes it worthwhile to kill crocodiles even without the danger involved in selling the skin. In 'country medicine' shops throughout the country crocodile fat is a rare but available 'remedy' for asthma, whooping cough or rheumatism.

The only available statistics on the Indian crocodile skin industry are for 1964-65 when a total of Rs. 25,948 worth of skins were exported to U.K. and France. The absence of statistics makes it difficult to assess the size of the industry (Bhanotar *et al.* 1975).

Legal Status and Protection :

Before the export of crocodile skins from India was controlled in 1969 (Instruction No. 57/75), crocodiles in some areas received protection as religious symbols. In some parts of Kerala it was customary to have a resident mugger in temple tanks and these were zealously protected by the villagers. The famous Mugger Pir near Karachi in Pakistan still exists today and here the last three resident mugger are venerated and fed by the local people. Effective and thorough 'paper' protection for Indian crocodilians was accomplished only in 1972 (Wildlife Protection Act, 1972). The three species are listed under Schedule I of the Act, rendering the killing, trapping, transporting or being in possession of a crocodile or its products without a special permit illegal with a penalty of upto 6 months imprisonment and Rs. 2,000 fine. Export instruction No. 46/73 forbids the export of crocodiles and gharial, their hides, or products therefrom.

Present Status :

State by state status accounts are given in Tables 1, 2, 3 and 4. Madras Snake Park field investigations have covered most states but only Tamil Nadu in great detail.

TABLE 1
PRESENT STATUS OF MUGGER (*Crocodylus palustris*)

State	Habitat	Estimate of numbers	Remarks
TAMIL NADU	Chidambaram Waterworks.	15-20	.. 4 breeding females. Good protection from Municipality.
	Kilkidu ' Crocodile Farm '.	20	.. 5 breeding females. Complete protection by local villagers and the Forest Department.
	Mettur Reservoir	Less than 10	..
	Sathanur Reservoir	12	.. 6 breeding females. State Crocodile Project site.
	Bhavani Sagar Reservoir	Less than 10	..
	Kedarhalla and Moyar Stream.	Less than 10	.. 6 breeding females. Recommended as Crocodile Preserve.
KARNATAKA	Amaravathi Reservoir	25	.. 12 breeding females, State Crocodile Project site.
	Hogonekal Falls (Cauvery R.).	Less than 10	.. 3 breeding females.
	Ranganathitoo Bird Sanctuary (Cauvery R.).	Less than 10	.. 1 breeding female.
Tamil Nadu has less than 200 wild crocodiles but this is the largest confirmed population in the country.			
Other rivers (other parts of Cauvery, Kabini, Thungabhadra, Nugu, etc.).			
A State Crocodile Project has been initiated at Bannerghatta National Park, near Bangalore.			
KERALA	Neyyar Reservoir	Less than 10	.. 1 nesting female. One of the sites for the State Crocodile Project.
	Parambikulam Reservoir.	Less than 5	.. 1 breeding female.
The total crocodile population of Kerala probably does not exceed 30.			
ANDHRA PRADESH	Godavari R.	Less than 10	..
	Krishna R.	Less than 10	..
State Crocodile Project for <i>C. palustris</i> and <i>C. porosus</i> initiated in 1976.			

STATUS OF INDIAN CROCODILIANS

- MAHARASHTRA .. Borivli National Park .. Less than 10
 Tadoba National Park .. Less than 20
 Other Parks and Rivers .. c 50
 Population probably less than 100.
- MADHYA PRADESH .. Large rivers e.g. Mahanadi, Son, Betwa, Ken. Less than 100
 Muger formerly very plentiful in tanks and rivers. Forest Dept. is taking conservation measures.
- ORISSA .. Major rivers like Mahanadi, Bahmani, small reservoirs, tanks. Less than 20
- No breeding population known. Extensive State Crocodile Project commenced in 1975, with a mugger rehabilitation centre at Simlipal.
- GUJARAT .. Hiran Lake (Gir National Park). 60 .. 6 nests located in 1977.
 Other reservoirs and tanks in the State. Small remnant populations.
- Gujarat has the second largest mugger population in the country and the Forest Dept. has initiated a crocodile rehabilitation project.
- RAJASTHAN .. Chambal R. Reservoirs and tanks .. Less than 20
 A State Crocodile Project was initiated in 1975. Few isolated individuals ..
- UTTAR PRADESH .. Ramganga (Corbett National Park) Rivers, streams .. 8
 Under 100
 Large scale State Crocodile Project underway since 1975.
- BIHAR .. Remote rivers and jungle lakes Total less than 50
 Some rehabilitation work has been started by the Forest Department.
- WEST BENGAL .. Ganga and other rivers .. Under 30
 A project for the three species has been commenced by Forest Department.
- ASSAM .. All rivers .. No mugger reported in recent years.
 Muger seem to be extinct in Assam.

TABLE I

PRESENT STATUS OF MUGGER (*Crocodylus palustris*)

State	Habitat	Estimate of numbers	Remarks
TAMIL NADU	Chidambaram Waterworks.	15-20	.. 4 breeding females. Good protection from Municipality.
	Kilikudu ' Crocodile Farm '.	20	.. 5 breeding females. Complete protection by local villagers and the Forest Department.
	Mettur Reservoir	.. Less than 10	..
	Sathanur Reservoir	.. 12	6 breeding females. State Crocodile Project site.
	Bhavani Sagar Reservoir	.. Less than 10	..
	Kedarhalla and Moyar Stream.	Less than 10	.. 6 breeding females. Recommended as Crocodile Preserve.
	Amaravathi Reservoir	.. 25	.. 12 breeding females, State Crocodile Project site.
	Hogenekal Falls (Cauvery R.).	Less than 10	.. 3 breeding females.
Tamil Nadu has less than 200 wild crocodiles but this is the largest confirmed population in the country.			
KARNATAKA	Ranganathitoo Bird Sanctuary (Cauvery R.).	Less than 10	.. 1 breeding female.
	Other rivers (other parts of Cauvery, Kabini, Thungabhadra, Nugu, etc.).	Very few, totalling less than 100.	less
A State Crocodile Project has been initiated at Bannerghatta National Park, near Bangalore.			
KERALA	Neyyar Reservoir	.. Less than 10	.. 1 nesting female. One of the sites for the State Crocodile Project.
	Parambikulam Reservoir.	Less than 5	.. 1 breeding female.
The total crocodile population of Kerala probably does not exceed 30.			
ANDHRA PRADESH	Godavari R.	.. Less than 10	
	Krishna R.	.. Less than 10	
State Crocodile Project for <i>C. palustris</i> and <i>C. porosus</i> initiated in 1976.			
MAHARASHTRA	Borivli National Park	.. Less than 10	
	Tadoba National Park	.. Less than 20	
	Other Parks and Rivers	.. c 50	
	Population probably less than 100.		
MADHYA PRADESH	Large rivers e.g. Mahanadi, Son, Betwa, Ken.	Less than 100	
Mugger formerly very plentiful in tanks and rivers. Forest Dept. is taking conservation measures.			
ORISSA	Major rivers like Mahanadi, Bahmani, small reservoirs, tanks.	Less than 20	
No breeding population known. Extensive State Crocodile Project commenced in 1975, with a mugger rehabilitation centre at Simlipal.			
GUJARAT	Hiran Lake (Gir National Park).	60	.. 6 nests located in 1977.
	Other reservoirs and tanks in the State.	Small remnant populations.	
Gujarat has the second largest mugger population in the country and the Forest Dept. has initiated a crocodile rehabilitation project.			
RAJASTHAN	Chambal R.	.. Less than 20	
	Reservoirs and tanks	.. Few isolated individuals	..
A State Crocodile Project was initiated in 1975.			
UTTAR PRADESH	Ramganga (Corbett National Park)	8	
	Rivers, streams	.. Under 100	
Large scale State Crocodile Project underway since 1975.			
BIHAR	Remote rivers and jungle lakes	Total less than 50	
Some rehabilitation work has been started by the Forest Department.			
WEST BENGAL	Ganga and other rivers	.. Under 30	
A project for the three species has been commenced by Forest Department.			
ASSAM	All rivers	.. No mugger reported in recent years.	
Mogger seem to be extinct in Assam.			